WHAT IS CLAIMED IS:

1. A method for adding and dropping channels from an optical transmission medium, comprising:

receiving an input signal having at least two input channels;

receiving an add signal having at least one add channel;

transmitting the input channels and the add channels through an optical switch matrix, the optical switch matrix having one or more optical switches that are capable of redirecting the input channels and add channels as they pass through the optical switch matrix; and

outputting an output signal by configuring the one or more optical switches of the optical switch matrix so that at least one of the input channels is replaced by the at least one add channel.

2. The method of claim 1, further comprising demultiplexing an input optical signal to provide input channel signals to the one or more optical switch.

3. The method of claim 2, wherein each channel of the input signal has specific wavelengths.

4. The method of claim 3, wherein the input signal is a wavelength-division-multiplexed optical signal.

5. The method of claim 1, further comprising multiplexing signals on the channels to produce a multiplexed output optical signal.

6. The method according to claim 1, wherein the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate.

7. The method according to claim 6, wherein the micromirrors are capable of being in one of an active state for redirecting light passing in close proximity to the switch, and an inactive state in which light passing in close proximity to the switch is not redirected.

8. The method according to claim 1, wherein the optical switch matrix is an array of bubble switches, each being capable of redirecting light.

9. The method according to claim 8, wherein the bubble switches are capable of being in one of an active state for redirecting light passing through the switch, and an inactive state in which light is not redirected as the light passes through the bubble switch.

10. A method for adding and dropping channels from an optical transmission medium, comprising:

transmitting input channels and add channels through an optical switch matrix, the optical switch matrix having one or more optical switches that are capable of redirecting the input channels and the add channels as they pass through the optical switch matrix;

configuring the one or more optical switches of the optical switch matrix so that at least one of the input channels is redirected away from a corresponding output channel, and at least one of the add channels is redirected to the output channel.

11. The method of claim 10, further comprising demultiplexing an input optical signal to provide input channel signals to the one or more optical switch.

12. The method of claim 11, wherein each channel of the input signal has specific wavelengths.

13. The method of claim 12, wherein the input signal is a wavelength-division-multiplexed optical signal.

14. The method of claim 10, further comprising multiplexing signals on the channels to produce a multiplexed output optical signal.

15. The method according to claim 10, wherein the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate.

16. The method according to claim 15, wherein the micromirrors are capable of being in one of an active state for redirecting a channel passing in close proximity to the switch, and an inactive state in which a channel passing in close proximity to the switch is not redirected.

17. The method according to claim 10, wherein the optical switch matrix is an array of bubble switches, each being capable of redirecting a channel.

18. The method according to claim 17, wherein the bubble switches are capable of being in one of an active state for redirecting a channel passing through the switch, and an inactive state in which a channel is permitted to pass through the bubble switch.

19. A device for adding data to an optical signal having a plurality of channels, comprising:

a plurality of channel paths, one or more of the plurality of channels being directed to one or more optical switches;

one or more light sources providing one or more additional signal at the one or more optical switch; and

a controller that configurates the one or more optical switch so as to selectively add each one of the one or more additional signals to one of the plurality of channels of the optical signal.

20. The device of claim 19, further comprising a selector that selects, for each one of the one or more additional signal, the optical switch for adding the additional signal.

21. The device of claim 19, further comprising a demultiplexer that demultiplexes an input optical signal to provide input channel signals to the one or more optical switch.

22. The device of claim 20, wherein each channel of the optical signal has specific wavelengths.

23. The device of claim 21, wherein the optical signal is a wavelength-division-multiplexed optical signal.

24. The device of claim 19, further comprising multiplexing signals on the channels to produce a multiplexed output optical signal.

25. A device for dropping one or more channel signals from an optical signal having a plurality of channels, comprising:

a plurality of channel paths, one or more of the plurality of channels being directed to one or more optical switches;

one or more input port providing one or more channel signal at the one or more optical switch; and

a controller that configures the one or more optical switch so as to selectively drop one or more channel signals.

26. The device of claim 25, wherein each channel is associated with specific wavelengths of the optical signal having a plurality of channels.

27. The device of claim 26, wherein the optical signal having a plurality of channels is a wavelength-division-multiplexed optical signal.

28. The device of claim 25, further comprising a selector that selects, for each one of the one or more channel signal, the optical switch for dropping the channel signal.

29. The device of claim 25, further comprising a demultiplexer that demultiplexes the optical signal having a plurality of channels to produce the channel signals.

30. An optical switching device, comprising:

an optical switch matrix having one or more optical switches that are capable of redirecting optical channels passing therethrough;

an input port coupled to the optical switch matrix that receives at least one channel from an optical medium and transmits the at least one channel to the optical switch matrix;

an output port coupled to the optical switch network that receives at least one output channel from the optical switch matrix and transmits the at least one output channel to the optical transmission medium;

an add port coupled to the optical switch matrix that inputs add channels to the optical switch matrix;

a drop port coupled to the optical switch matrix that receives dropped channels from the optical switch matrix; and

wherein the switches of the optical switch matrix can be selectively configured so that at least one of the input channels is directed to the drop port and at least one add channel is directed to the output port.

31. The optical switching device according to claim 30, wherein the optical switch matrix includes a first array of switches and a second array of switches.

32. The optical switching device according to claim 31, wherein the first array of switches and the second array of switches are an N x M array of switches, and the input port and the drop port are coupled to the first array of switches, while the add port and the output port are coupled to the second array of switches.

33. The optical switching device according to claim 32, wherein the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate.

34. The optical switching system according to claim 33, wherein the first array redirects optical channels from the input port to the drop port, and the second array redirects optical channels from the add port to the output port.

35. The optical switching device according to claim 31, wherein the first array of switches is an M x M array of switches, and the second array of switches is an N x M array of switches, and the add port is coupled to the first array of switches and the input port, output port, and drop port are coupled to the second array of switches.

36. The optical switching device according to claim 35, wherein the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate.

37. The optical switching device according to claim 36, wherein an input channel is re-directed to a drop port by a front side of a first micromirror of the N x M array of switches, and an add channel is redirected to an output port by a front surface of a second micromirror of the M x M array of switches and a back surface of the first micromirror of the N x M array of switches.

38. The optical switching device according to claim 31, wherein the first array of switches is an N x M array of switches, and the second array of switches is an M x M

array of switches, and the drop port is coupled to the second array of switches and the input port, output port, and add port are coupled to the first array of switches.

39. The optical switching device according to claim 38, wherein the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate.

40. The optical switching device according to claim 39, wherein an input channel is re-directed to a drop port by a front side of a first micromirror of the N x M array of switches and a front surface of the M x M array of switches, and an add channel is redirected to an output port by a back surface of the first micromirror of the N x M array of switches.

41. The optical switching device according to claim 30, wherein the optical switch matrix is a microelectrical mechanical system having an array of micromirrors arranged on a substrate.

42. The optical switching device according to claim 41, wherein an input channel is redirected to a drop port by a front side of a first micromirror and an add channel is redirected to an output port by a back first surface of the first micromirror.

43. The optical switching device according to claim 30, wherein the optical switch matrix is an array of bubble switches, each being capable of redirecting light.